

(f)(1) An operator, using an inherent entrapment protection system that monitors the actual position of the door, shall initiate reversal of the door and shall return the door to, and stop the door at, the full upmost position in the event the inherent door operating "profile" of the door differs from the originally set parameters. The entrapment protection system shall monitor the position of the door at increments not greater than 1 inch (25.4 mm).

(2) The door operator is not required to return the door to, and stop the door at, the full upmost position when an inherent entrapment circuit senses an obstruction during the upward travel.

(3) The door operator is not required to return the door to, and stop the door at, the full upmost position when a control is actuated to stop the door during the upward travel—but the door can not be moved downward until the operator reverses the door a minimum of 2 inches (50.8 mm).

(g)(1) An operator, using an inherent entrapment protection system that does not monitor the actual position of the door, shall initiate reversal of the door and shall return the door to and stop the door at the full upmost position, when the lower limiting device is not actuated in 30 seconds or less following the initiation of the close cycle.

(2) The door operator is not required to return the door to, and stop the door at, the full upmost position when an inherent entrapment circuit senses an obstruction during the upward travel. When the door is stopped manually during its descent, the 30 seconds shall be measured from the resumption of the close cycle.

(3) The door operator is not required to return the door to, and stop the door at, the full upmost position when a control is actuated to stop the door during the upward travel—but the door can not be moved downward until the operator reverses the door a minimum of 2 inches (50.8 mm). When the door is stopped manually during its descent, the 30 seconds shall be measured from the resumption of the close cycle.

§ 1211.8 Secondary entrapment protection requirements.

(a) A secondary entrapment protection device supplied with, or as an accessory to, an operator shall consist of:

(1) An external photoelectric sensor that when activated results in an operator that is closing a door to reverse direction of the door and the sensor prevents an operator from closing an open door,

(2) An external edge sensor installed on the edge of the door that, when activated results in an operator that is closing a door to reverse direction of

the door and the sensor prevents an operator from closing an open door,

(3) An inherent door sensor independent of the system used to comply with § 1211.7 that, when activated, results in an operator that is closing a door to reverse direction of the door and the sensor prevents an operator from closing an open door, or

(4) Any other external or internal device that provides entrapment protection equivalent to paragraphs (a)(1), (a)(2), or (a)(3) of this section.

(b) With respect to paragraph (a) of this section, the operator shall monitor for the presence and correct operation of the device, including the wiring to it, at least once during each close cycle. In the event the device is not present or a fault condition occurs which precludes the sensing of an obstruction, including an open or short circuit in the wiring that connects an external entrapment protection device to the operator and device's supply source, the operator shall be constructed such that:

(1) A closing door shall open and an open door shall not close more than 1 foot (305 mm) below the upmost position, or

(2) The operator shall function as required by § 1211.6(b)(1).

(c) An external entrapment protection device shall comply with the applicable requirements in §§ 1211.10, 1211.11 and 1211.12.

(d) An inherent secondary entrapment protection device shall comply with the applicable requirements in § 1211.13. Software used in an inherent entrapment protection device shall comply with the Standard for Safety for Software in Programmable Components, UL 1998, Second Edition, May 29, 1998. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112, Telephone (800) 854-7179 or Global Engineering Documents, 7730 Carondelet Ave., Suite 470, Clayton, MO 63105, Telephone (800) 854-7179. Copies may be inspected at the Consumer Product Safety Commission, Office of the Secretary, 4330 East West Highway, Bethesda, Maryland or at the

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National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

[65 FR 70658, Nov. 27, 2000]

§ 1211.9 Additional entrapment protection requirements.

(a) A means to manually detach the door operator from the door shall be supplied. The gripping surface (handle) shall be colored red and shall be easily distinguishable from the rest of the operator. It shall be capable of being adjusted to a height of 6 feet (1.8 m) above the garage floor when the operator is installed according to the instructions specified in § 1211.14(a)(2). The means shall be constructed so that a hand firmly gripping it and applying a maximum of 50 pounds (223 N) of force shall detach the operator with the door obstructed in the down position. The obstructing object, as described in § 1211.7(b), is to be located in several different positions. A marking with instructions for detaching the operator shall be provided as required by § 1211.15(i).

(b) A means to manually detach the door operator from the door is not required for a door operator that is not directly attached to the door and that controls movement of the door so that:

(1) The door is capable of being moved open from any position other than the last (closing) 2 inches (50.8 mm) of travel, and

(2) The door is capable of being moved to the 2-inch point from any position between closed and the 2-inch point.

(c) Actuation of a control that initiates movement of a door shall stop and may reverse the door on the down cycle. On the up cycle, actuation of a control shall stop the door but not reverse it.

(d) An operator shall be constructed so that adjustment of limit, force or other user controls and connection of external entrapment protection devices

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can be accomplished without exposing normally enclosed live parts or wiring.

[57 FR 60455, Dec. 21, 1992, as amended at 65 FR 70658, Nov. 27, 2000]

§ 1211.10 Requirements for all entrapment protection devices.

(a) *General requirements.* (1) An external entrapment protection device shall perform its intended function when tested in accordance with paragraphs (a) (2) through (4) of this section.

(2) The device is to be installed in the intended manner and its terminals connected to circuits of the door operator as indicated by the installation instructions.

(3) The device is to be installed and tested at minimum and maximum heights and widths representative of recommended ranges specified in the installation instructions. For doors, if not specified, devices are to be tested on a minimum 7 foot (2.1 m) wide door and maximum 20 foot (6.1 m) wide door.

(4) If powered by a separate source of power, the power-input supply terminals are to be connected to supply circuits of rated voltage and frequency.

(5) An external entrapment protection device requiring alignment, such as a photoelectric sensor, shall be provided with a means, such as a visual indicator, to show proper alignment and operation of the device.

(b) *Current protection test.* (1) There shall be no damage to the entrapment protection circuitry if low voltage field-wiring terminals or leads are shortened or miswired to adjacent terminals.

(2) To determine compliance with paragraph (b)(1) of this section, an external entrapment protection device is to be connected to a door operator or other source of power in the intended manner, after which all connections to low voltage terminals or leads are to be reversed as pairs, reversed individually, or connected to any low voltage lead or adjacent terminal.

(c) *Splash test.* (1) An external entrapment protection device intended to be installed inside a garage 3 feet or less above the floor shall withstand a water exposure as described in paragraph (c)(2) of this section without resulting in a risk of electric shock and shall function as intended. After exposure,